

What is CDAT?
A brief tour

What is CDAT?

- **A quick tour of CDAT, showing:**
 - VCDAT – the CDAT GUI
 - Running CDAT from Python scripts
 - Running CDAT interactively
 - Applications on top of CDAT
 - Quick look at some code
 - Documentation – PCMDI portal

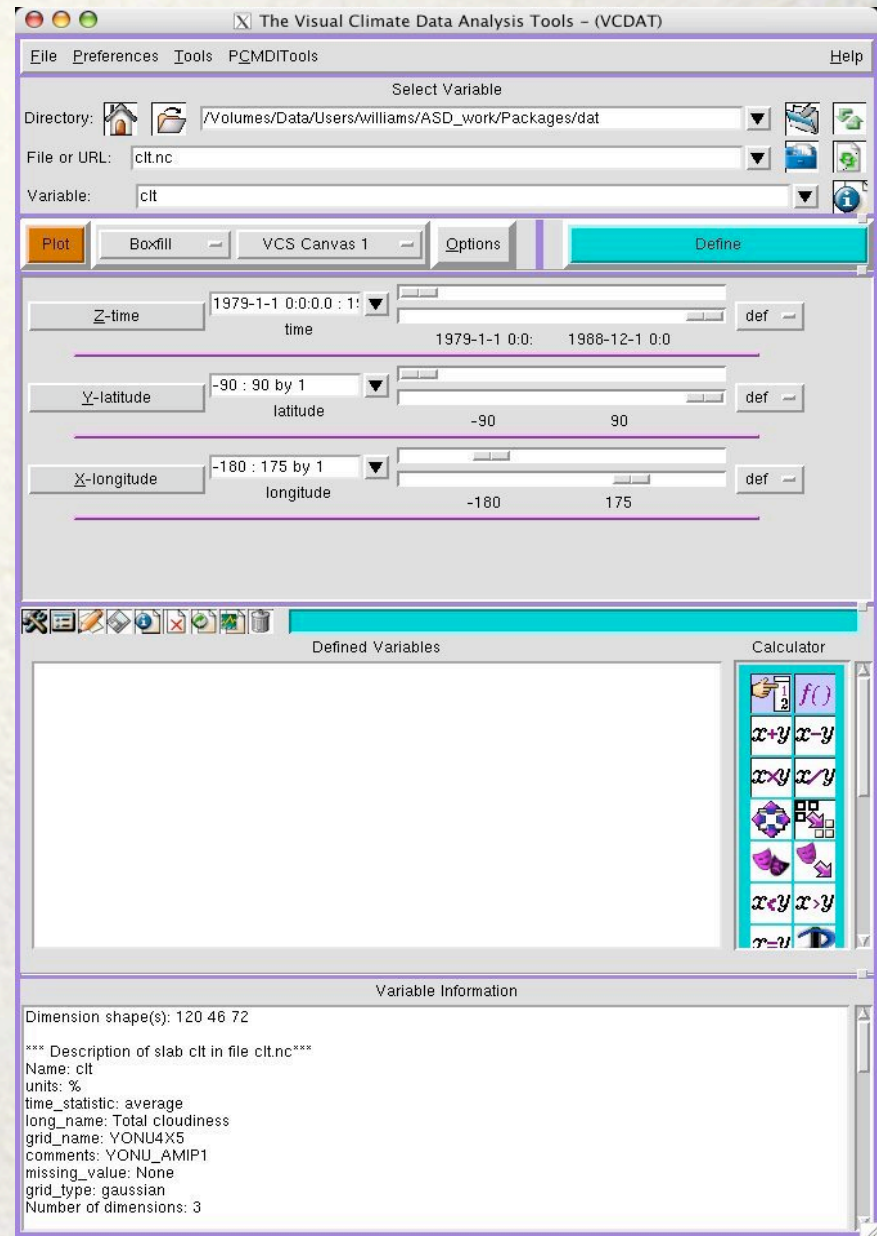
CDAT Propaganda

- Developed at the Program for Climate Model Diagnosis and Intercomparison (PCMDI), USA.
- Designed for climate science data
- Scriptable
- Analysis, conversion, sub-setting and array operations
- Interfaces to Fortran and C/C++
- Visualization system (VCS, Xmgrace, VTK)
- Graphical User Interface (VCDAT)
- XML representation (CDML) for datasets
- Integrated with other packages (such as LAS and OPeNDAP)
- Open-source and free
- URL: <http://www-pcmdi.llnl.gov/software-portal>



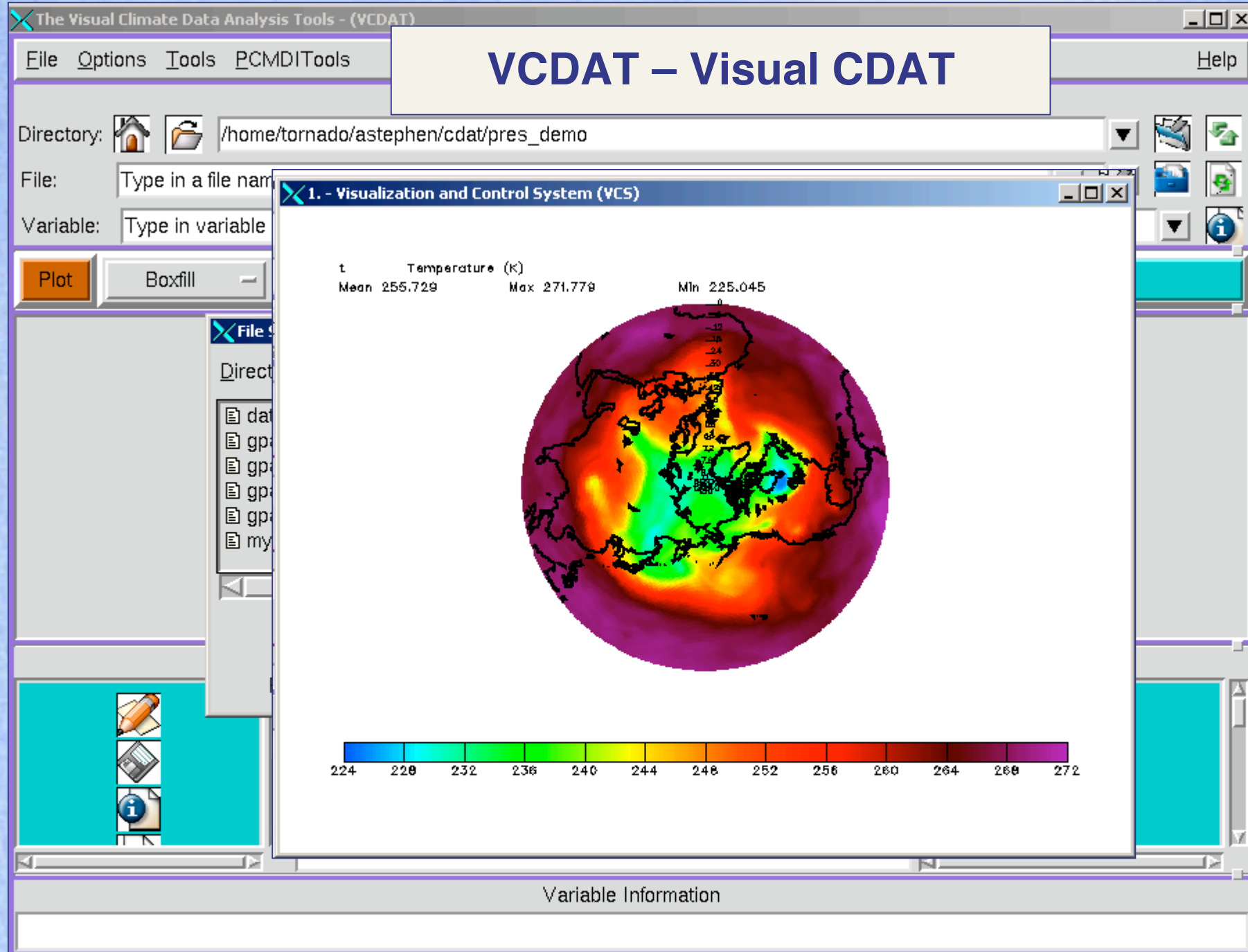
VCDAT – Visual CDAT

- VCDAT lets you get familiar with many parts of CDAT
- Start by typing “**vcdat**” at the command line.



VCDAT – Visual CDAT

- VCDAT is usually the first tool that newcomers to CDAT experience.
- It provides a Graphical User Interface (GUI) to CDAT's functionality.
- Advantages:
 - no need to learn scripting
 - incorporates different CDAT sub-packages seamlessly
 - provides tips on how to script CDAT.
 - allows interaction between GUI and command line



Running CDAT from Python scripts

- CDAT ***IS*** Python!
- You can combine with any python code.
- Python interfaces to Fortran/C/C++ allow you to bind to lower level languages.
- Python is really useful for other applications.
- Flexible control of data objects (*wave goodbye to loops*).
- You can build applications directly on top of CDAT since it is python.

Running CDAT from Python scripts

```
#!/usr/bin/env python

print "I am a python script."

print "Let's import some CDAT modules..."
import cdms, vcs

print "Open a data file, grab some data..."
f=cdms.open("myfile.nc")
var=f('temperature', latitude=(0,90),
      time="2004-12-17")

print "Plot the data..."
canvas=vcs.init()
canvas.plot(var)
print "So long!"
```

Running CDAT interactively

- You can work interactively with CDAT because python has an interactive prompt.
- Run **'python'**, **'cdat'**, or **'idle'**:

```
>>> print "hello"
"hello"

>>> import Numeric

>>> arr1=Numeric.array([1,3,4,6], 'f')
>>> arr2=Numeric.array([3,1,0,-2], 'f')
>>> print arr1+arr2
[ 4., 4., 4., 4.,]
```

Applications on top of CDAT

- Building on top of CDAT is simple, some example applications are:
 - BADC Data Extractor:
<http://cdat.badc.nerc.ac.uk/cgi-bin/dxui.py>
 - NetCDF CF-convention checker:
<http://titania.badc.rl.ac.uk/cgi-bin/cf-checker.pl>
 - ClimatePrediction.net:
<http://www.climateprediction.net>

BADC Data Extractor

W
 E

S

Select from map

Note that the map Java applet may not work in Netscape 4.0

[Note about interpolation methods.]

Vertical Domain

Levels

Single level

Time

Dataset 1: Start time

1979

01

01

00

00

00

year month day hour min sec

1979

01

01

00

00

00

End time

Format

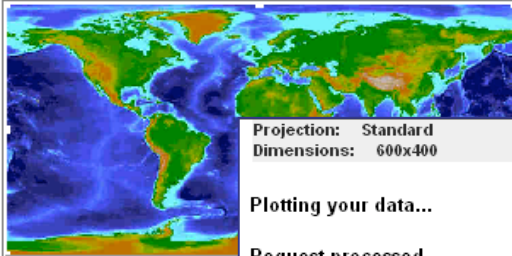
NetCDF

Note that you should choose NetCDF format if you are using a Java-enabled browser

Proceed

Choose this selection

VIEW: Longitude-Latitude



90.0 N

180.0 W


180.0 E

Projection: Standard

Dimensions: 600x400

Plotting your data...

Request processed...



NERC Centres for Atmospheric Science

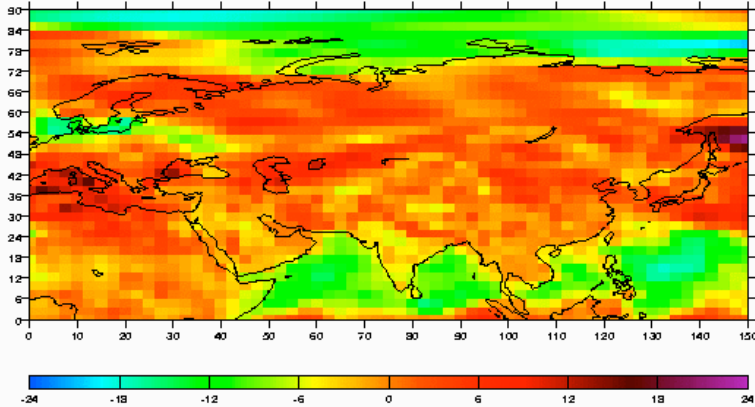
NATURAL ENVIRONMENT RESEARCH COUNCIL

Source: British Atmospheric Data Centre (<http://badc.nerc.ac.uk>)

new_var Differenced dataset: no10u - no10u

Mean: -1.46611 Max: 21.3742 Min: -20.4533

1979/01 0:0:00



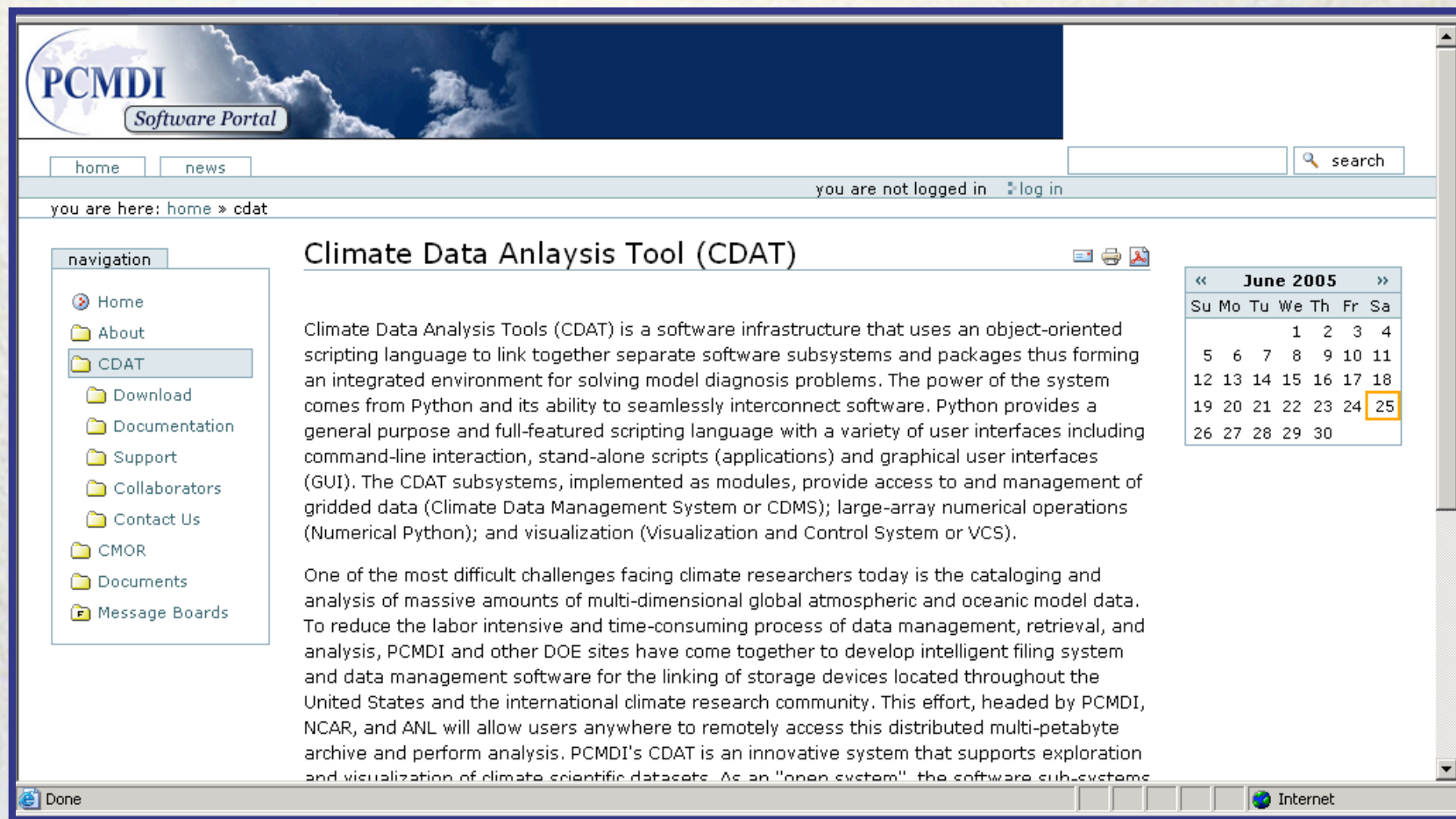
Typical usage examples of CDAT

- calculate a long-term average
- define wind-speed from u- and v-components
- subset a dataset, selecting a spatiotemporal region
- aggregate 1000s of files into a small XML file.

CDAT Documentation

- See searchable online documentation at:

<http://www-pcmdi.llnl.gov/software-portal/cdat>



The screenshot shows the PCMDI Software Portal website. The header includes the PCMDI logo and a search bar. The main content area is titled "Climate Data Analysis Tool (CDAT)" and contains a detailed description of the software infrastructure. A navigation sidebar on the left lists various links, and a calendar for June 2005 is visible on the right.

PCMDI Software Portal

home news search

you are not logged in log in

you are here: home » cdat

navigation

- Home
- About
- CDAT**
 - Download
 - Documentation
 - Support
 - Collaborators
 - Contact Us
- CMOR
- Documents
- Message Boards

Climate Data Analysis Tool (CDAT)

Climate Data Analysis Tools (CDAT) is a software infrastructure that uses an object-oriented scripting language to link together separate software subsystems and packages thus forming an integrated environment for solving model diagnosis problems. The power of the system comes from Python and its ability to seamlessly interconnect software. Python provides a general purpose and full-featured scripting language with a variety of user interfaces including command-line interaction, stand-alone scripts (applications) and graphical user interfaces (GUI). The CDAT subsystems, implemented as modules, provide access to and management of gridded data (Climate Data Management System or CDMS); large-array numerical operations (Numerical Python); and visualization (Visualization and Control System or VCS).

One of the most difficult challenges facing climate researchers today is the cataloging and analysis of massive amounts of multi-dimensional global atmospheric and oceanic model data. To reduce the labor intensive and time-consuming process of data management, retrieval, and analysis, PCMDI and other DOE sites have come together to develop intelligent filing system and data management software for the linking of storage devices located throughout the United States and the international climate research community. This effort, headed by PCMDI, NCAR, and ANL will allow users anywhere to remotely access this distributed multi-petabyte archive and perform analysis. PCMDI's CDAT is an innovative system that supports exploration and visualization of climate scientific datasets. As an "open system" the software sub-systems

June 2005

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		